Recent Challenges and Security Issues on Cloud Computing Environment – A Potential Solution

Mujtaba Ashraf Qureshi
Deptt. I.T (Scholar), Mewar University, Rajathan.
mujtaba170@gmail.com

D.r Azad Kumar Shrivastava
Professor, Mewar University,
Chittorgarh, Rajasthan.

Dr. Irshad Ahmad Mir
Assistant Professor, J&K,
Higher Education,C.S.

Abstract: Cloud computing has prejudicedmaximum of the domains of modern world and is disseminating out its roots at very debauched pace. Most of the well-grown industrialists and corporations and other business persons are shifting their business plans to cloud computing services. Cloud computing makes relaxedaccessibility tomandatory resources for different organizations, research centers, corporations, industrialists, universities, hospitals etc. to accomplish their work with satisfactoryconsequences. The process of virtualization acts as backbone for cloud computing services. The services available in cloud computing falls under three broad categories: Infrastructure as a service (IAAS), Platform as a Service (PAAS) and Software as a Service (SAAS). These categories provide services as infrastructure, platform and software to users respectively. So cloud services are available based on the type and demand of the domain or any organization. Even resources are allocated to users according to their necessities. But many people think it is insecure to use cloud resources and its facilities. It is unsafe to use cloud because there is no guarantee of information which is controlled or preserved by the vendors. There are some security issues that are observed in cloud computing. In this paper author has discussed a few designated issues of cloud computing and the challenges of cloud computing. This paper stretches overall investigation of security, protection and issues in the cloud computing environment.Furthermore author has presented the most suitable solution/solutions to every issue demarcated in this research paper.

I. Introduction

Cloud computing is acquiring more acceptance than previous deployed models [1]. The most influential and prominent business organizations and corporations have completely shifted their business to cloud computing and enjoying its benefits very much. Thus a company achieves all the facilities at one place such as infrastructure, different platforms and software to perform business activities. Clod computing charges based upon the usage time and type of facility. As a person or a business delinks service it would be not be charged anymore. This also depends upon the agreement plan of a company or any and cloud computing corporation. A conclusion is drawn that cloud computing is a vast collection of various hardware and software facilities available for a user. The cloud

computing model comprises of five characteristics, three services and four deployment models. Infrastructure as a service (IAAS), Platform as a Service (PAAS) and Software as a Service (SAAS) are called service models of cloud. Private cloud, Community cloud, Public cloud and Hybrid cloud are deployment models.
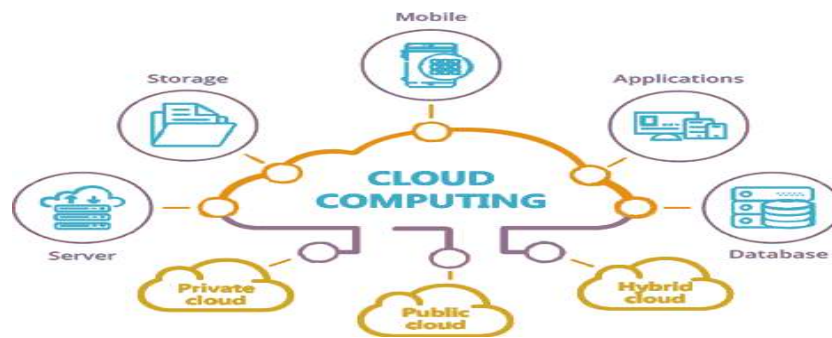

Figure 1: Cloud Network.

However there are some security issues linked with cloud computing which is considered one of the serious issues related to cloud computing environment. This paper presents an overview of challenges and issues and their remedial and prospective solutions. Also the applications, review of literature and some legal issues [2] are highlighted.

In sub-section *I.1* and *I.2* of Introduction part, the gap in research and aim of research is presented, respectively.

I.1   Research Gap: The cloud computing domain is yet struggling in initial phases of growth and development, so a moderate level of research work is carried out to study issues, challenges, features, applications and solutions to this field. No doubt existing studies and research is highlighting such types of issues but to capture and highlight the very basic issues and challenges is the foremost requirement of the cloud computing. So this research paper aims to highlight the very basic issues and their prospective solutions are concluded.

I.2.   Aim: This research work purposes to highlight and present some of the very basic challenges in cloud computing and to propose their prospective solutions.

II. Features and Application of Cloud Computing

Cloud computing is counted among great and advanced technologies of this world. Most of the renowned and advanced technologies are employed the services of cloud computing. Some of the main and important applications [3,4] are presented and discussed below:

- ➢ By using cloud computing users can entrée its possessions and facilities anytime from anywhere by using to Internet [4].
- ➢ By using cloud computing users don't need to purchase structure and applications. Because User can access these resources or pay them according to their needs. In early time Organizations totally depend on systems for processing their work and users need to purchase all resources and licenses for a long time. In Cloud

computing user can take the benefits of all resources without purchasing it. Pay a pay-per-use policy is used in cloud computing [5,4].

➢ Hardware costs are reduced by using cloud and consumers have no supplies of acquiring the system with large number of space, hard disk etc. [5] [4] [6].

➢ With cloud computing there is no problem of space. Thus, users can access, limitless space and can access it by taking it on rent [4] [7].

➢ The cloud system uses the processing power of less presented system to maximize the speed of the computations [1][4][8]. It has various advantages as compared to traditional techniques, but it also has its own issues that are discussed below.

➢ Some of the principal and foremost features of cloud computing are reliability, location management, highly automated, device management, 24*7 availability, storage management *etc.Figure 2 depicts various features of cloud computing.*
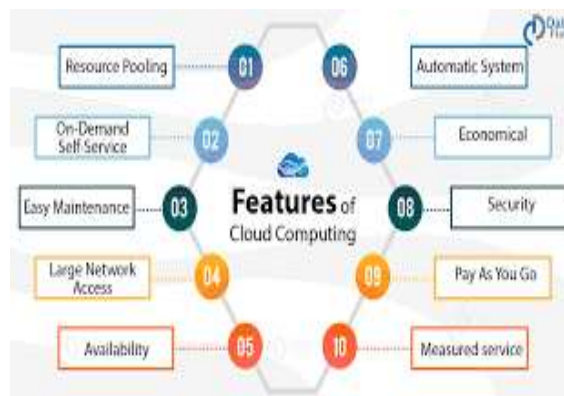

Figure 2: Cloud Features

III. Issuesin Cloud computingand How to Overcome.

The main issue is security and privacy and these concerns are discussed below in detail. There are number of issues and challenges in cloud computing however some of them to mention is more important than others. Thus some of important and foremost issues and challenges in the way of cloud computing are given as under. In this research a concise survey is performed to select only the main issues and challenges of cloud computing.

a) *Security Issues*

b) *Privacy Issues*

c) *Higher bandwidth Issues*

d) *Cloud cost management Issues*

e) *Service quality Issues*

f) Portability Issues

g) Password security Issues

h) Lack of Expertise Issues
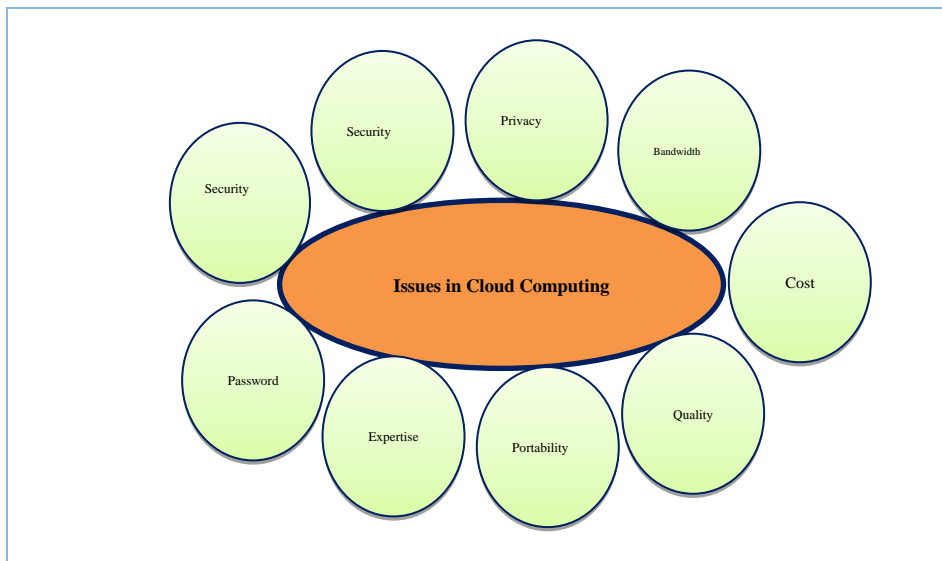
i) Internet connectivity Issues

Figure 3: Various Issues in Cloud Computing.

a) Security Issues

Security issues of cloud computing and cloud services is considered foremost problem for cloud users. There are various issues which are needed to be taken for making cloud computing a secure and trustworthy for all and some of the main issues are, misconfiguration, hijacking of accounts, malicious insiders, cyber-attacks, accidental exposure of data, insecure APIs and many more. Misconfigurations of cloud security settings are a principal source of cloud data breaches. Many organizations' security management approaches are insufficient for defensive their cloud-based infrastructure. Out of premises or organizations' control also makes it relaxed for an invader to gain illegal admission to an organization's cloud-based possessions. Improperly-configured security or cooperated identifications can allow an aggressor to gain direct access, possibly without an organization's knowledge. The hijacking of accounts is one of the more stern cloud safety issues as organizations are progressively dependent on cloud-based organization and submissions for core business functions.Choice of Database is a vitalconstituent in the software stack of many cloud hosted applications [11]. An aggressor with an employee's identifications can access delicate data or functionality, and negotiatedpurchaseridentifications give full control over their online account. Moreover, in the cloud, administrations often lack the capability to classify and reply to these pressures as efficiently as for on-premises infrastructure. The confidentiality of data is main motive

behind the privacy issue and if data details are exposed to external environment, it is proved very big loss to an organization which uses cloud computing services.

How to Overcome Security Issues:

- Needs well defined and well-designed tight security protocols.
- To develop and maintain corporate culture for data security methods.
- Provide regular training courses to working staff so to enable them work in parallel to fast changing technology.
- More focus is in need to develop alert application if data breach occurs anytime.

b) Privacy Issues

Privacy is always given a very high weightage as if a data breach occurs it spoils the large investment projects within very small period of time. Cloud computing organizations must ensure to strength the privacy of data by employing more secured firewalls and others security soft wares. Privacy remains the foremost demand of every person or organization.

How to Overcome Privacy Issues:

- There must be secured protocols used to avoid the loss or misuseof data.
- If there is any need to transfer or migrate data, more sophisticated encryption techniques should be employed.
- Complete compilation of rules and regulation must be followed to maintain data privacy.
- Enterthe password and other log incredentials in only authenticated websites, sometimes hackers pretend to be real service providers but instead they are about to access to your private data.

c) Higher Bandwidth Issues

Bandwidth here refers to the channel capacity to transmit data and is measured in bits per second (bps). If bandwidth of a communication path increases, then performance of the network also increases. Transferring data to and from cloud platforms is both a procedural and economic apprehension that should be addressed. Cloud computing without proper network deliberation can cause bandwidth blockage, creating transport delays and issues. Think about it, how much figures does your organization have? No conceive that data was all flowing to your cloud platform at once it's easy to see how cloud passages can take a toll on the primary network.

How to Overcome Bandwidth Issues:

- Existing protocols are employed sometimes to remove the barrier data from communication paths.
- High speed internet communication (higher bandwidth) is the foremost requirement to solve this problem, so there must be proper networking devices and proper topologies employed to meet the high data prerequisite.

- A short range mobile tower is in need for areas having hilly and mountainous terrains to make them capable to access to required bandwidth.

d) Cloud Cost Management Issues

Cloud computing platforms and their services are growing continuously in popularity and there exists a tough competition between giant cloud service providers such as Google, Amazon Web Services (AWS), and Microsoft Azure offer modest prices to attract enterprises. This concept is an idea to accomplish all the cloud expenditures of dealings professionally. The process principally comprises understanding the costs linked to cloud and eliminating the needless ones. In short, it means finding the most profitable ways to enhancepractice at the lowest price possible. Thus, it includes network traffic, handling memory, occurrences, storage, and several other expenses. Some of the main challenges and issues of cloud cost management are complexity in billing, budget forecasting, lack of visibility about their data in cloud, software inefficiency etc.

How to Overcome Cost Management Issues:

- Close running instances that are not in use anymore for organization.
- Choose the right type of occurrences for the condition i.e. smart utilization of cloud features should be taken to avoid unnecessary usage of resources.
- Use discounts and free storage whenever possible
- Deploy containers such as docker or kubernetes, which helps to migrate data easily from one environment to another.

e) Service Quality Issues

Service quality always remains an issue between services providers and service consumers. No doubt cloud computing provide an acceptable level of services however due to fast growing nature of data and high demand, cloud service providers lacks to meet the complete requirements of service qualities. So cloud service developers and engineers needs to enhance existing technologies in incessant manner to meet the present as well as future service quality demands.

How to Overcome Service Quality Issues:

- Managementof the services in Big Data in the cloud [9].
- Innovative tools and strategies should be used to investigative the visibility Limitation. This can be completed by using appropriate data monitoring and the forecasts.
- Managers of IT should feast the consciousness of the Service Level Agreements.
- Managementof the quality of service by assimilatingdiverse architecture models into the cloud is a bigger challenge. This can be accomplished by selecting the suitable database model like RDBMS and MySql.
- A regular and close watch for the services is foremost and mandatory step to deliver quality of services.

f) Portability Issues:

Some of the tasks and challenges that gave birth when applications need to be moved include battles that are shaped when operating system and hypervisor versions in the target cloud do not match those in the source cloud, alterations in performance metrics used by the original and the new cloud provider.

Transferring applications between clouds includes making sure those strategies that guarantee the accessibility, safety, speed, and consistency of applications are also transferred from the source to the target cloud. These strategies include rules and guidelines for load balancing, safety, acceleration, optimization, storing, network, and entree.

How to Overcome Portability Issues:[10]

- Numerous efforts are being made to progress open and registered APIs. Open API efforts done by Open Cloud Computing Interface Working Group, Sun's Open Cloud API, VMware's DMTF-submitted vCloud API.
- Registered APIs include Amazon EC2 API, Rackspace API, GoGrid's API. DMTF's Open Virtualization Format (OVF) is being established to support with movability and interoperability issues.
- Google has joined hands with VMware to offer cloud portability resolutions that allows enterprise designers to grow and install web applications across manifoldsurroundings and devices.
- Google also supports data portability and is underway the Data Liberation Front whose main aim is to make it easier and calmer for users to transfer their data in and out of Google products using the current open standards.

g) Password Security Issues:

Mobile phone password and other confidential material are considered more vulnerable to hackers. Because they're porous, proliferating and turning into primary forms of digital IDs, mobile devices and their passwords do a favorite onramp for hackers want access to companies' systems and data in the cloud. It's time to kill passwords and shut down the many breacheffortsintended at cloud platforms and the valued data they comprise. Moreover to make more secure data in cloud storage must follow all the rules and regulations regarding password generation and other related issues.

How to Overcome Password Security Issues:

- Arrange Multi-Factor Verification
- Apply different security credentials for every module of an application.
- Manage automated application for intruders for alert purposes.
- Always code for strong and combination of different keys for password setting such as alphabets, numeric, special symbols, capital and small letter combination.
- There is a need for innovation in password saving mechanism to avoid access to credentials of a company or a person.

h) Expertise Issues:

Dearth of the needed resources and skilled human resource is one of the major challenges in cloud computing in 2017. This is credited to several factors which include lack of exercise, manifold and dissimilar cloud vendors and the introduction of hybrid clouds. Today, it's still hard to find exercise and training for cloud expertise and knowledge.

Cloud providers also vary depending on needs, and there is frequently a high likelihood to go for the incorrect organization if we are not conscious of these alterations. Also, bringing mixtureof cloud arrangement in the mix has made it even firm and harder for organizations to determine and regulate a suitable choice.

How to Overcome **Expertise** *Issues:*

- Regular training of staff is needed to update about the trending and current technologies.
- Staff sharing between well-developed companies must be initiated and progressed to learn in different environments.
- Hire different experts from developed countries regarding the field to provide regular live training sessions.
- Take active participation in different forums related to the domain.

i) Internet Connectivity Issues:

Internet is the backbone of cloud computing as internet is the only approach which makes cloud computing possible. There are many challenges of cloud computing associated with internet issues. As most of the regions in world which still are working at very speed internet connections due to non- availability of internet high speed connection. This issue also arises due to difficult and far flung terrains and topography of various areas. Cloud computing needs very high speed transmission rate as there is need of high speed migration of data.

How to Overcome **Internet Connectivity** *Issues:*

- To use sophisticated devices and better recognized protocols to solve internet issues.
- To hire experts for guiding and maintain internet connection in good conducive environment.
- Needs to verify all the services existing between end to end nodes.
- Check internet configuration settings at regular intervals of time.
- Use trouble shoot networking soft wares regularly.
- Use other inbuilt diagnostic tools to verify and testify internet connection.

IV Conclusion

In conclusion, cloud computing is recently new technicalexpansion that has the possibility to have a great influence on the world. It has many benefits that it delivers to its users and industries. For example, some of the benefits that it delivers to businesses and trades are that

it decreasesworking cost to some extent by expenditureof less on upkeep and software advancements and focus more on the businesses itself.

But there are other issues and challenges the cloud computing must overcome. People are very cynical about whether their data is safe and secluded. There are no better existing standards or guidelines worldwide provided data through cloud computing. Even US, such a developed country lacks laws related to cloud computing data protection approaches; however Europe has some acceptable data protection laws. Users also worry about who can reveal their data and have possession of their data. But once, there are ethics and directives worldwide, cloud computing will transform the future. The author has presented some of the special prospective solutions to various cloud computing issues and challenges. Also if these solutions would be practical with passion and desire; it will benefit the future of cloud computing a lot.

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